SECTION 5 PARTS LIST

NOTE: Parts with an asterisk (*) denotes those values that are used in the 162-174 MHz range units. All other listed parts are common to both units.

When ordering parts, please include the following information:

a. Model Number
b. Item Number
c. Description
d. Part Number

5-1 RF — TRANSMIT AUDIO BOARD

Item No.	Description	Part No.
	RESISTORS	
R201	100 ohm, 10%, ¼W	4701-0101-042
R202	4.7K, 10%, ¼W	4701-0472-042
R203	10K, 10%, ¼W	4701-0103-042
R204	1K, 10%, ¼W	4701-0102-042
R205	1K, 10%, ¼W	4701-0102-042
R206	680 ohm, 10%, ¼W	4701-0681-042
R211	33 ohm, 10%, ¼W	4701-0330-042
R212	10K, 10%, ¼W	4701-0103-042
R213	39K, 10%, ¼W	4701-0393-042
R214	1.5K, 10%, ¼W	4701-0152-042
R232	1.5K, 10%, ¼W	4701-0152-042
R233	10K, 10%, ¼W	4701-0103-042
R234	100K, 10%, ¼W	4701-0104-042
R235	100K, 10%, ¼W	4701-0104-042
R236	100, 10%, ¼W	4701-0101-042
R237	1.5M, 10%, ¼W	4701-0155-042
R238	4.7K, 10%, ¼W	4701-0472-042
R239	4.7K, 10%, ¼W	4701-0472-042
R240	100, 10%, ¼W	4701-0101-042
R241	39K, 10%, ¼W	4701-0393-042
R242	10K, 10%, ¼W	4701-0103-042
R243	470K, 10%, ¼W	4701-0474-042
R244	10K, Trimmer	4751-0103-001
R245	10K, 10%, ¼W	4701-0103-042
	CAPACITORS	
C201	10pf, 10%, NPO, 500V (Disc)	1500-0100-905
*C201	8.2pf, 10%, NPO, 500V (Disc)	1500-0829-905
C202	.27pf, 10%, (Composition)	1510-0278-900
C203	8.2pf, 10%, NPO, 500V (Disc)	1500-0829-905
*C203	6.8pf, 10%, NPO, 500V (Disc)	1500-0689-905
C204	1.5pf, ±.25pf, NPO, 500V (Disc)	1500-0159-205
C206	5.6pf, 10%, NPO, 500V (Disc)	1500-0569-905
*C206	3.9pf, 10%, NPO, 500V (Disc)	1500-0399-905
C207	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C208	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C209	.68pf, 10% (Composition)	1510-0688-900
C210	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C211	220pf, 5%, 50V (Mica)	1506-0221-550
C212	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C217	18pf, 10%, NPO, 500V (Disc)	1501-0180-001
*C217	15pf, 10%, NPO, 500V (Disc)	1501-0150-001
C218	68pf, 5%, 50V (Mica)	1506-0680-550
C219	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C220	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C221	82pf, 5%, 50V (Mica)	1506-0820-550
C236	3.9pf, 10% NPO, 500V (Disc)	1500-0399-905
C237	.01 mfd, 100V 10%, (Mylar Film)	1508-0103-610
C238	1 mfd, 50V 85°C (Electrolytic)	1513-0010-001
C239	10 mfd, 10V 85°C (Electrolytic)	1513-0100-004
C240	.022 mfd, 100V 10%, (Mylar Film)	1508-0223-610
C241	150pf, 5% 50V (Mica)	1506-0151-550
C242	0.1 mfd, 20%, 12V (Disc)	1510-0688-900

Item No.	Description	Part No.
C243	150pf, 5%, 50V (Mica)	1506-0151-550
*C243	100pf, 5% 50V (Mica)	1506-0101-550
C244	.01 mfd +80% −20%, 500V (Disc)	1503-0103-001
	COILS	
L201	Antenna Input (Brown)	1800-3152-001
L202	RF Input (Red)	1800-3152-002
L203	RF Output (Black)	1800-3152-008
L204	Oscillator, emitter	1801-1236-900
L205	Mixer Output	1800-3238-500
T201	Oscillator, output	1800-3170-100
	DIODES	
CR201	Silicon, Signal	4805-1241-200
CR202	Silicon, Signal	4805-1241-200
	TRANSISTORS	
Q201	Silicon, NPN (Red Top)	4801-0000-035
Q202	Field Effect, Junction	4811-0000-030
Q204	Silicon, NPN	4801-0000-095
	INTEGRATED CIRCUITS	
IC201	Dual Amplifier	3130-3167-909
	CRYSTAL FILTERS	
XF201	2P Xtal Filter 10.7 MHz	2705-3232-200
XF202	2P Xtal Filter 10.7 MHz	2705-3232-200

*Indicates values used in 162-174 MHz units.

5-2 DIODE SWITCHING BOARD

Item No.	Description	Part No.
	RESISTORS	
R701	1.5K, 10%, ¼W	4701-0152-042
R702	1.5K, 10%, ¼W	4701-0152-042
	DIODES	
CR701	Germanium Junction, Signal	4807-1233-900
CR702	Germanium Junction, Signal	4807-1233-900

5-3 IF — AUDIO BOARD

Item No.	Description	Part No.
	RESISTORS	
R101	18K, 10%, ¼W	4701-0183-042
R102	10K, 10%, ¼W	4701-0103-042
R103	1K, 10%, ¼W	4701-0102-042
R104	180 ohm, 10%, ¼W	4701-0181-042
R105	220 ohm, 10%, ¼W	4701-0221-042
R106	180 ohm, 10%, ¼W	4701-0181-042
R107	22K, 10%, ¼W	4701-0223-042
R108	47K, 10%, ¼W	4701-0473-042
R109	33 ohm, 10%, ¼W	4701-0330-042
R110	270K, 10%, ¼W	4701-0274-042
R111	4.7K, 10%, ¼W	4701-0472-042
R112	8.2K, 10%, ¼W	4701-0822-042
R113	2.2K, 10%, ¼W	4701-0222-042
R114	39K, 10%, ¼W	4701-0393-042
R115	10K, 10%, ¼W	4701-0103-042
R116	5.6K, 10%, ¼W	4701-0562-042
R117	2.2K, 10%, ¼W	4701-0222-042
R118	100 ohm, 10%, ¼W	4701-0101-042
R119	10K, 10%, ¼W	4701-0103-042
R120	10K, 10%, ¼W	4701-0103-042
R121	18K, 10%, ¼W	4701-0183-042
*R121	Not Used	
R122	5.6K, 10%, ¼W	4701-0562-042
R123	10K, 10%, ¼W	4701-0103-042
R124	3.3K, 10%, ¼W	4701-0332-042
R125	180 ohm, 10%, ¼W	4701-0181-042
R126	560 ohm, 10%, ¼W	4701-0561-042
R127	1K, 10%, ¼W	4701-0102-042
R128	33K, 10%, ¼W	4701-0333-042
R129	68K, 10%, ¼W	4701-0683-042
R130	18K, 10%, ¼W	4701-0183-042
R131	2.2K, 10%, ¼W	4701-0222-042
R132	2.2K, 10%, ¼W	4701-0222-042
R133	56 ohm, 10%, ¼W	4701-0560-042
R134	560 ohm, 10%, ¼W	4701-0561-042
R136	100 ohm, 10%, ¼W	4701-0101-042
R137	68 ohm, 10%, 2W (wire wound)	4710-0680-041
	CAPACITORS	
C101	47pf, 5%, 50V (Mica)	1506-0470-550
C102	.01 mfd, 10%, 100V (Mylar Film)	1508-0103-610
C103	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C104	.01 mfd, 10%, 100V (Mylar Film)	1508-0103-610
C105	220pf, 5%, 50V (Mica)	1506-0221-550
C106	220pf, 5%, 50V (Mica)	1506-0221-550
C107	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C108	.01 mfd, +80 −20%, 500V (Disc)	1503-0103-001
C109	68pf, 5%, 50V (Mica)	1506-0680-550
C110	.2 mfd, +80 −20%, 12V (Disc)	1502-0204-006
C111	180pf, 5%, 50V (Mica)	1506-0181-550
C112	390pf, 5%, 50V (Mica)	1506-0391-550
C113	270pf, 5%, 50V (Mica)	1506-0271-550
C114	250pf, 5%, 50V (Mica)	1506-0251-550
C115	.2 mfd, +80 −20%, 12V (Disc)	1502-0204-006
C116	.2 mfd, +80 −20%, 12V (Disc)	1502-0204-006
C117	.2 mfd, +80 −20%, 12V (Disc)	1502-0204-006
C118	39pf, 10%, NPO, 500V (Disc)	1500-0390-605
C119	.002 mfd, 20%, 500V (Disc)	1523-0202-001
C120	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C121	.01 mfd, 10%, 100V (Mylar Film)	1508-0103-610
C122	470pf, 20%, 500V (Disc)	1523-0471-001
C123	.015 mfd, 10%, 100V (Mylar Film)	1508-0153-610
C124	.002 mfd, 20%, 500V (Disc)	1523-0202-001
C125	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C126	.1 mfd, 20%, 12V (Disc)	1502-0104-005
C127	5 mfd, 50V, 85°C (Electrolytic)	1513-0050-004
*C127	1 mfd, 50V, 85°C (Electrolytic)	1513-0010-004
C128	.047 mfd, 10%, 100V (Mylar Film)	1500-0473-610
C129	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
C130	10 mfd, 25V, 85°C (Electrolytic)	1513-0100-003
C131	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C132	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C133	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C134	.2 mfd, +80 −20%, 12V (Disc)	1502-0204-006
C136	1000 mfd, 16V, 85°C (Electrolytic)	1511-0102-002
C137	250 mfd, 10V, 85°C (Electrolytic)	1511-0251-001
C138	.001 mfd, +80 −20%, 50V (Disc)	1503-0000-008
	COILS	
L101	Choke, R.F.	1803-3238-600
L102	Choke, R.F.	1803-3238-600
L103	Quadrature Detector	1800-3151-700
T101	Input, 10.7 MHz IF AMP	1800-3238-400
T102	Output, 10.7 MHz IF AMP	1800-3168-300
	DIODES	
CR101	Silicon, Signal	4805-1241-200
CR102	Zener, 8.2V 5%, 1W	4808-0000-009
	TRANSISTORS	
Q101	Silicon, NPN	4801-0000-010
Q102	Silicon, NPN	4801-0000-010
Q103	Silicon, PNP (White Top)	4801-0000-060
Q104	Silicon, NPN	4801-0000-010
Q105	Silicon, NPN	4801-0000-010
Q106	Silicon, NPN	4801-0000-010
Q107	Silicon, PNP, AF Driver	4801-0000-135
Q108	Silicon, PNP, AF Driver	4801-0000-135
Q109	Silicon, NPN, AF Output	4802-0000-002
Q110	Silicon, NPN, AF Output	4802-0000-002
	INTEGRATED CIRCUITS	
IC101	IF Amplifier	3130-3167-901
IC102	IF Limiter/Dtector	3130-3157-603
	CRYSTAL	
Y101	10.245 MHz (Standard)	2301-3151-601
Y101	11.155 MHz (Special)	2301-3151-602

5-4 LED BOARDS

Item No.	Description	Part No.
	FILTER	
CF101	Ceramic, 455 KHz	2700-0000-008

*Indicates value used in micro-com 24S

Item No.	Description	Part No.
	RESISTORS	
R401	470 10%, ¼W	4701-0471-042
R402	470 10%, ¼W	4701-0471-042
R501	680 10%, ¼W	4701-0681-042
R601	680 10%, ¼W	4701-0681-042
	CAPACITORS	
C501	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
C601	.001 mfd, +80 −20%, 500V (Disc)	1503-0102-001
	DIODES	
LD401	Led Red	4810-1282-900
LD405	Led Red	4810-1282-900
LD406	Led Green	4810-1299-300
LD501	Led Red	4810-1282-900
LD502	Led Red	4810-1282-900
LD601	Led Red	4810-1282-900
LD602	Led Red	4810-1282-900
LD603	Led Red	4810-1282-900
LD604	Led Red	4810-1282-900

5-5 RELAY BOARD

Item No.	Description	Part No.
	RESISTORS	
R1001	1.5K, 10%, ¼W	4701-0152-042
	CAPACITORS	
C1001	250 mfd, 15V, 85°C (Electrolytic)	1513-0251-002
C1002	.05 mfd +80 −20%, 25V (Disc)	1502-0503-004
C1003	15 pf 10%, NPO 500V (Disc)	1500-0150-605
C1004	15pf, 10%, NPO, 500V (Disc)	1500-0150-605
C1005	15pf, 10%, NPO 500V (Disc)	1500-0150-605
C1006	.001 mfd, +80 −20% .50V (Disc)	1503-0000-008
	DIODES	
CR1001	Diode, Silicon Rectifier	4806-0000-004
	RELAY	
RY1001	Relay 2 PDT 12V	4500-3251-900

5-6 TRANSMITTER BOARD 501-067

Item No.	Description	Part No.
	RESISTORS	
R301	270 ohm, 10%, ¼W	4701-0271-042
R303	4.7 ohm, 10%, ¼W	4701-0479-042
R304	10 ohm, 10%, ¼W	4701-0100-042
R305	470 ohm, 10%, ¼W	4701-0471-042
R306	100 ohm, 10%, ¼W	4701-0101-042
R308	3.9K, 10%, ¼W	4701-0392-042
R310	10 ohm, 10%, ¼W	4701-0100-042
R311	39 ohm, 10%, ¼W	4701-0390-042
R312	27K, 10%, ¼W	4701-0273-042
R313	1K, 10%, ¼W	4701-0102-042
R314	18K, 10%, ¼W	4701-0183-042
R315	100 ohm, 10%, ¼W	4701-0101-042
R316	150 ohm, 10%, ¼W	4701-0151-042
R317	56K, 10%, ¼W	4701-0563-042
R318	3.9K, 10%, ¼W	4701-0392-042
R319	68K, 10%, ¼W	4701-0683-042
R320	100K, 10%, ¼W	4701-0104-042
R321	1.5K, 10%, ¼W	4701-0152-042
R322	27K, 10%, ¼W	4701-0273-042
R323	39K, 10%, ¼W	4701-0393-042
R324	180 ohm, 10%, ½W	4701-0181-044
R325	100K, 10%, ¼W	4701-0104-042
R326	100K, 10%, ¼W	4701-0104-042
R328	100 ohm, 10%, ¼W	4701-0101-042
R329	3.3 ohm, 5%, ¼W	4701-0339-042
R330	22 ohm, 10%, ¼W	4701-0220-042
*R330	47 ohm, 10%, ¼W	4701-0470-042
R332	2K, 5%, ¼W	4701-0202-032
R333	560 ohm, 10%, ½W	4701-0561-044
R334	100 ohm, 5%, 2W (wire wound)	4701-0101-031
R335	100 ohm, 5%, 2W (wire wound)	4701-0101-031
RT301	Thermistor	5300-0000-001
	CAPACITORS	
C301	18pf, 10%, NPO, 50V (Disc)	1500-0180-650
*C301	15pf, 10%, NPO, 50V (Disc)	1500-0150-650
C302	18pf, 10%, NPO, 50V (Disc)	1500-0180-650
*C302	15pf, 10%, NPO, 50V (Disc)	1500-0150-650
C303	4-60pf, Trimmer	1517-0000-002
C304	390pf, 350V (Mica)	1522-0391-001
C305	.05 mfd, +80 −20%, 25V (Disc)	1502-0503-004
C306	10 mfd, 20%, 25V (Tant)	1515-0100-005
C307	.05 mfd, +80 −20%, 12V (Disc)	1502-0503-006
C308	2-18pf, Trimmer	1517-0000-001
C309	100pf, 5%, 50V (Mica)	1506-0101-550
C310	.1 mfd, 20%, 12V (Disc)	1502-0104-005
C311	15pf, 10%, NPO, 500V (Disc)	1500-0150-605
C312	33pf, 10%, NPO, 50V (Disc)	1500-6330-650
C313	.001 mfd, +80 −20%, 50V (Disc)	1503-0102-003
C314	.01 mfd, +80 −20%, 25V (Disc)	1502-0103-004
C315	270pf, 5%, 50V (Mica)	1506-0271-550
*C315	100pf, 5%, 50V (Mica)	1506-0101-550
C316	47pf, 5%, NPO, 50V (Disc)	1524-0470-002
C317	.005 mfd, +80 −20%, 50V (Disc)	1503-0502-005
C318	.005 mfd, +80 −20%, 50V (Disc)	1503-0502-005
C319	100pf, 5%, 50V (Mica)	1506-0101-550
*C319	82pf, 5%, 50V (Mica)	1506-0820-550
C320	10 mfd, 20%, 25V (Tant)	1515-0100-005
C322	82pf, 5%, 50V (Mica)	1506-0820-550
*C322	120pf, 5%, 50V (Mica)	1506-0121-550
C323	180pf, 5%, 50V (Mica)	1506-0181-550
*C323	390pf, 5%, 50V (Mica)	1506-0391-550
C324	.01 mfd, +80 −20%, 25V (Disc)	1502-0103-004
C325	.05 mfd, +80 −20%, 12V (Disc)	1502-0503-006
C326	100pf, 5%, 50V (Mica)	1506-0101-550
*C326	180pf, 5%, 50V (Mica)	1506-0181-550
C327	75pf, 5%, NPO, 50V (Disc)	1524-0750-002
*C327	100pf, 5%, 50V (Mica)	1506-0101-550
C328	47pf, 5%, NPO, 50V (Disc)	1524-0470-002
*C328	36pf, 5%, NPO, 50V (Disc)	1524-0360-001
C329	4.7pf, 10%, NPO, 500V (Disc)	1500-0479-905
C330	.1 mfd, 20%, 12V (Disc)	1502-0104-005
C331	100pf, 5%, 500V (Mica)	1504-0101-505
C332	270pf, 5%, 50V (Mica)	1506-0271-550
C334	36pf, 5%, NPO, 50V (Disc)	1524-0360-001
C335	2-18pf, Trimmer	1517-0000-001
C336	36pf, 5%, NPO, 50V (Disc)	1524-0360-001
C337	2-18pf, Trimmer	1517-0000-001
C338	36pf, 5%, NPO, 50V (Disc)	1524-0360-001
C339	2-18pf, Trimmer	1517-0000-001
C340	36pf, 5%, NPO, 50V (Disc)	1524-0360-001
C341	2-18pf, Trimmer	1517-0000-001
C342	1 mfd, 20%, 12V (Disc)	1502-0104-005
C358	390pf, 5%, 50V (Mica)	1506-0391-550
	COILS	
L301	Output, Antenna	1801-1244-700
L302	Output, Final	1801-1299-400
L303	Choke, RF Final (Collector)	1803-3189-800
L304	Choke, RF Final (Base)	1803-1245-900
L305	Input, Final	1801-1276-000
L306	Modulator, Phase (13MHz)	1800-1251-800
T301	Bridge, VSWR	1800-1244-800
T302	Output, Driver	1800-1244-500
T303	Output, Pre-driver (156MHz)	1800-3166-300
T304	Output, Doubler (78MHz)	1800-3166-200
T305	Output, Tripler (39 MHz)	1800-3166-100
E301	Bead, Ferrite	2502-0000-001
E302	Bead, Ferrite	2502-0000-001
E303	Bead, Ferrite	2502-0000-001
E304	Bead, Ferrite	2502-0000-001
	DIODES	
CR301	Silicon, Signal	4805-1241-200
CR302	Varactor, SMV1172	4809-0000-001
CR303	Varactor, SMV1172	4809-0000-001
CR304	Zener, 8.2V, 5%, ½W	4808-0000-013
CR305	Zener, 6.0V, 5%, ½W	4808-0000-012

Item No.	Description	Part No.
	TRANSISTORS	
Q301	Final RF Power	4804-3169-508
Q302	Driver, RF Power	4804-3169-603
Q303	Pre-driver, RF Power	4804-3169-605
Q304	Silicon, NPN	4801-0000-010
Q305	Silicon, NPN	4801-0000-005
Q306	Silicon, NPN	4801-0000-003
Q307	Silicon, NPN	4801-0000-003
Q308	Silicon, NPN	4801-0000-003
Q309	Silicon, NPN	4801-0000-010
Q310	Silicon, NPN	4802-0000-002

*Indicates values used in 162-174 MHz units.

5-7 CHASSIS ASSEMBLY

Item No.	Description	Part No.
	ELECTRICAL COMPONENTS	
R1	5K, Volume Control/switch SW-1	4750-3211-201
R2	7.5K, Squelch Control	4750-3211-202
C5	100 mfd, 10V, 85°C (Electrolytic)	1511-0101-001
C6	.047 mfd, 10%, 100V (Mylar Film)	1508-0473-610
SPK-1	Speaker, 3.2 ohm, 4 in. sq. (with mounting brackets)	7011-1069-100
SW201	Switch, PC Mount (Receive)	7011-1069-200
SW301	Switch, PC Mount (Transmit)	7011-1069-300
Y200	Crystal, Receive (Specify Frequency)	2311-0000-000
Y300	Crystal, Transmit (Specify Frequency)	2312-0000-000
F1	Fuse, 5 AMP, 3 AG	5106-0000-008
J1	Connector, Antenna (Chassis)	2105-0000-020
J2	Connector, Microphone (Chassis)	2105-0000-023
S1	Connector, Power (Chassis)	2109-5120-403
P1	Connector, Power (Cable)	2109-5120-303
S2	Connector, Speaker (Chassis)	2109-5120-403
P2	Connector, Speaker (Cable)	2109-5120-303
S3	Connector, Accessory (Chassis)	2109-5120-408
P2	Connector, Microphone (Cable)	2104-0000-009
	Insert Pin Female	2107-3244-102
	Insert Pin Male	2107-3244-202
	Socket Pins, Crystal Mounting	2830-0000-004
	DC Power Cord Assembly	7011-1078-100
	Microphone Assembly (with connector)	7011-1078-300
SW1/2	Switch Assembly, Push (Micro-Com 22)	5112-3174-901
SW4	Switch Assembly, Push (Micro-Com 21T)	5112-3174-902
SW4	Switch Slide (Micro-Com, 24S)	5113-3220-701
	MECHANICAL COMPONENTS	
	Detent, 4-position (Rotary Switch)	5105-1219-809
	Heat Sink, Driver Transistor	5400-0000-002
	Heat Sink, Final Transistor	5400-3211-800
	Front Panel Bezel	1405-5081-302
	Faceplate (Micro-Com 21)	2403-5117-100
	Faceplate (Micro-Com 21T)	2403-5117-300
	Faceplate (Micro-Com 22)	2403-5117-000
	Faceplate (Micro-Com 24)	2403-5115-100
	Faceplate (Micro-Com 24S)	2403-5116-800
	Faceplate (Micro-Com 21H)	2403-5117-200
	Faceplate (Micro-Com 21TH)	2403-5117-400
	Faceplate (Micro-Com 22H)	2403-5116-900
	Faceplate (Micro-Com 24H)	2403-5116-700
	*Faceplate (BTH-204H)	2403-5114-300
	Knob, Channel Selector	2402-1268-900
	Knob, Volume and Squelch	2402-1276-202
	Button Push, Black	2402-0000-010
	Cabinet (Wrap) Assembly	1408-6033-301
	Foot, Rubber	1402-0000-001
	Bracket, Mobile Mounting	1400-3143-100
	Bracket, Security (less lock)	1400-1241-500

Item No.	Description	Part No.
	Hanger, Microphone	2830-0000-003
	Hardware Kit, Mounting (bolts, washers, security bracket, mic hanger)	7011-1078-400
	Manual, Owner's Instruction (Micro-Com 21, 22, 24)	7001-1075-700
	Manual, Owner's Instruction (Micro-Com 21H, 22H, 24H)	7001-1075-800
	Manual Owner's Instruction (Micro-Com, 21T, 21TH)	7001-1075-900
	Manual, Owner's Instruction (Micro-Com, 24S)	7001-1076-500
	Manual Service ($5.00 prepaid)	SM-10-757

SECTION 6 C.T.C.S.S. ACCESSORY

6-1 CIRCUIT DESCRIPTION

This accessory provides a continuous tone coded sub-audible squelch function for the MICRO-COM 21t and 21th. Additionally, a call lamp function is provided to alert the user that an unattended radio has been signalled.

Detected signal from IC102 in the receiver is fed to IC801 and IC802; IC801 is a high-pass filter which removes tone frequencies from the audio. IC802 is a low-pass filter which selects the signalling frequencies and removes audio, feeding the signalling frequency to IC803 and IC804 which are the filter for the code frequency. IC803 is the frequency determining network and IC804 is an amplifier. IC805 is a detector which, when the proper frequency is present at the filter output, switches Q104 in the receiver off, unsquelching the receiver. The detector also drives inverter/delay Q801/IC806C which sets flip-flop IC806A and IC806B. This turns on the call lamp through switch Q804. Due to the latching action of the flip-flop, the call lamp will remain on after the coded signal is removed.

The Microphone Hang-up Button is connected through the Tone/Monitor Switch to IC804. When the Hang-up Button is grounded and SW4 is closed, the circuit operates as above. When the Hang-up Button is ungrounded, or SW4 is open, the decoder is disabled leaving the receiver under carrier-squelch control. Additionally, IC803 and IC804 go into oscillation at the tone code frequency and provide encode tone through R808, the tone deviation control, to the transmitter. At the same time, Switch Q802 is turned on and through inverter IC806D, resets the flip-flop, turning off the call lamp.

Transistor Q803 provides a reset pulse to the flip-flop when power is first applied to the unit. This ensures that the call lamp is off when the radio is first turned on.

6-2 ADUSTMENT PROCEDURE

a. Connect the unit to the R.F. Wattmeter or Dummy load.

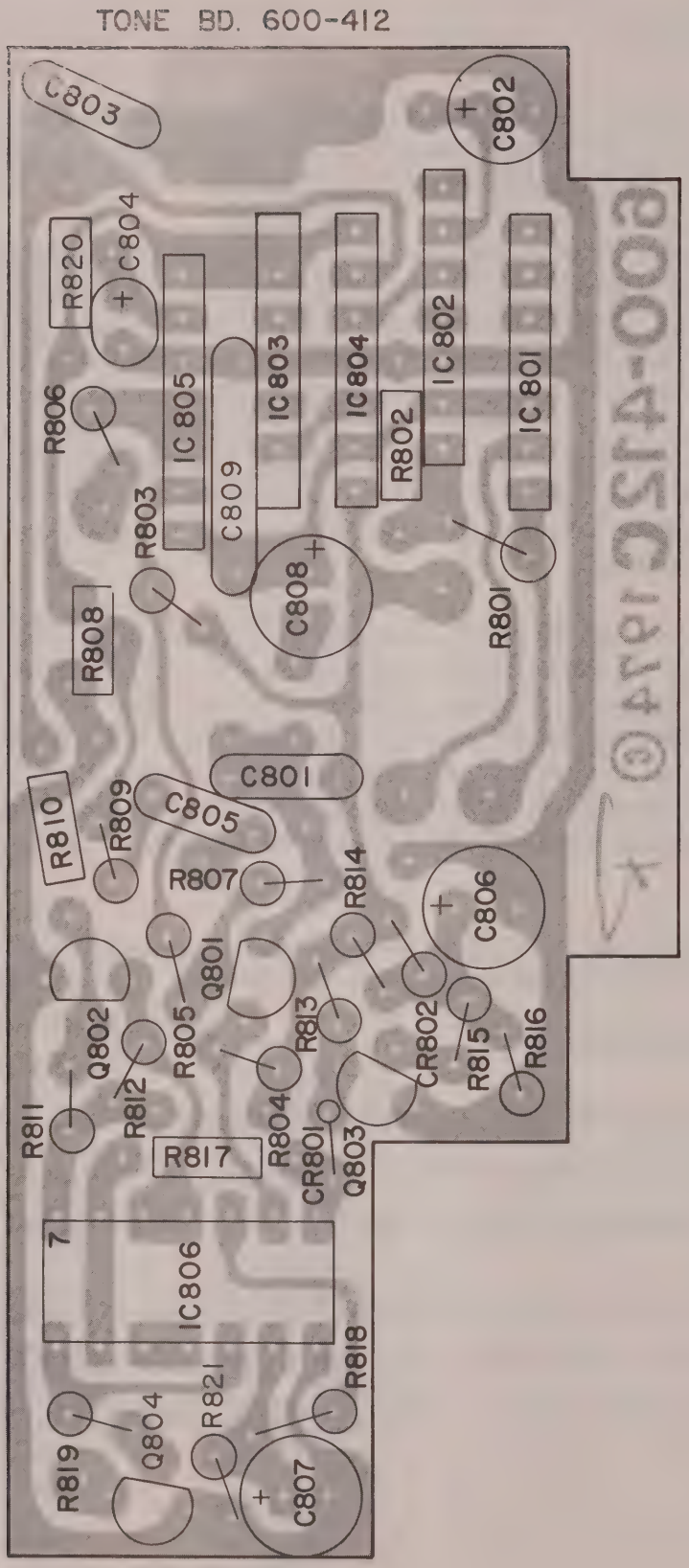
b. Couple an F.M. Modulation Meters' RF pick-up to the transmitter.

c. With the microphone off-hook or with SW4 in the Monitor position, key the transmitter.

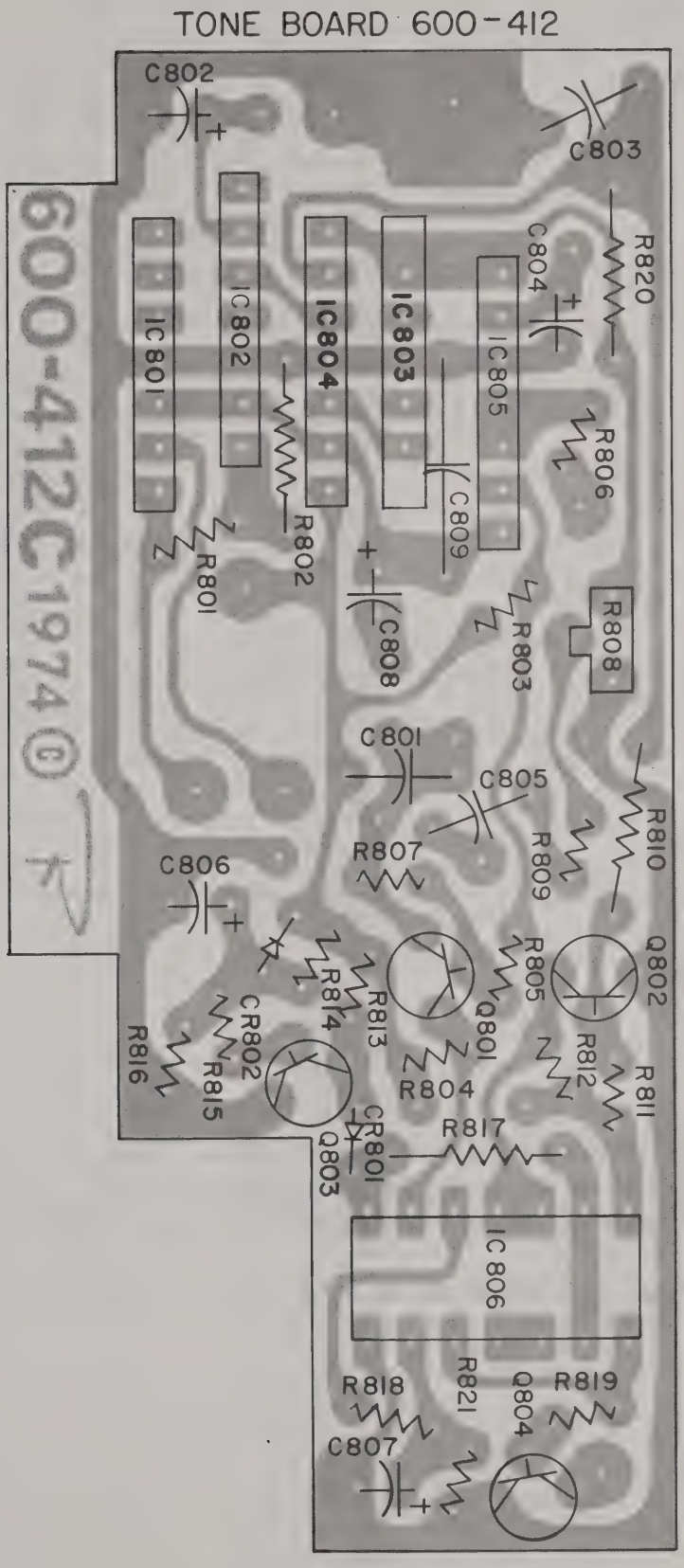
d. Adjust the Tone Deviation Control, R808, for ±0.5 to ±1.0 KHz tone deviation.

e. Apply 0.5 to 1.0 volts RMS at 1 KHz audio to the microphone input.

f. Adjust the Deviation Control, R244, for ±5 KHz composite deviation.



6-3 DECODER BOARD PARTS PLACEMENT DIAGRAM



6-4 DECODER BOARD BOTTOM VIEW

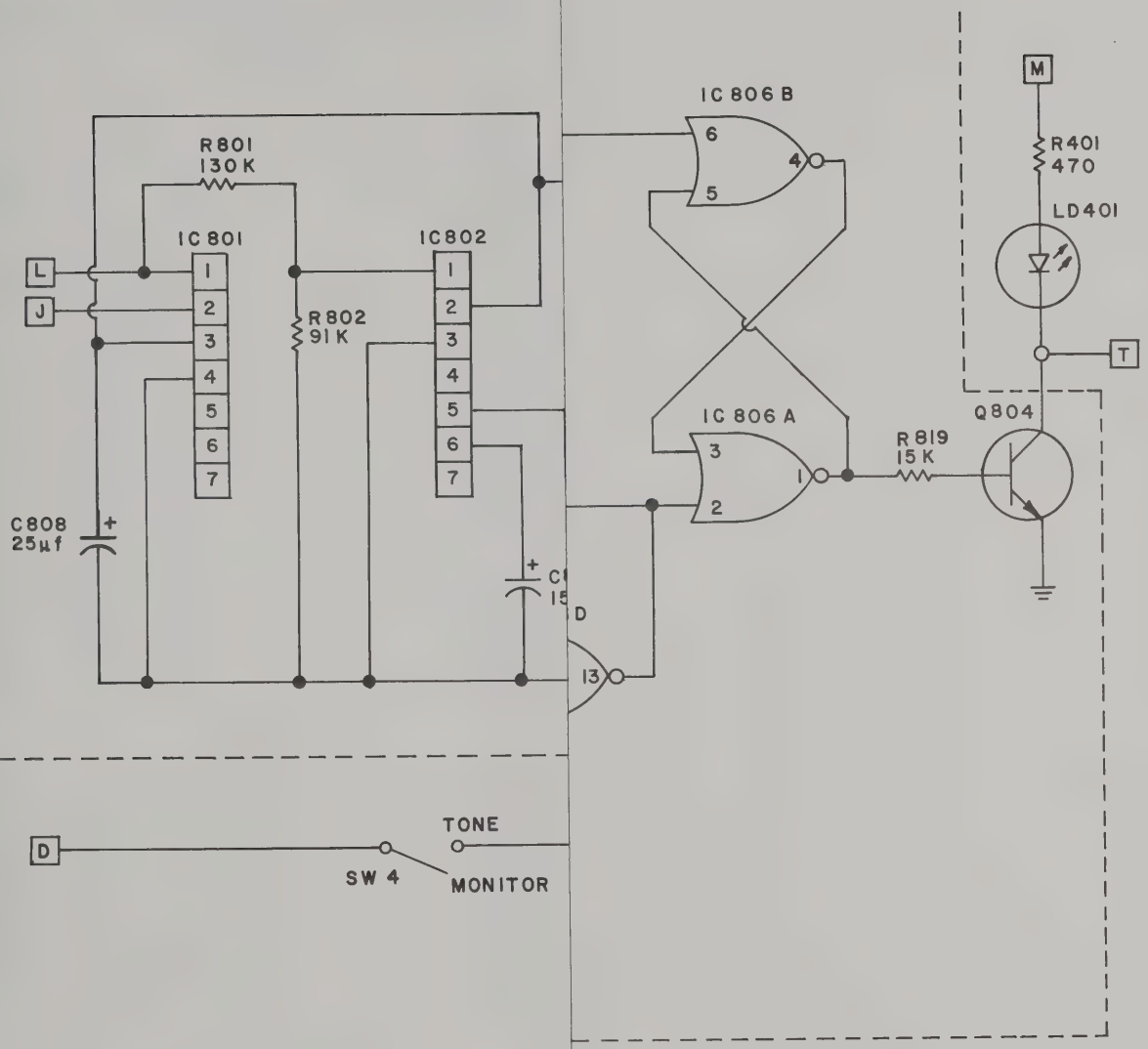
6-5 VOLTAGE DATA CHART

INTEGRATED CIRCUITS

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC801	4.4	AC	10	0	NC	NC	NC	—	—	—	—	—	—	—
IC802	1.8	10	0	NC	6	5.5	NC	—	—	—	—	—	—	—
(2)	1.6													
IC803	5.6	NC	0	NC	5.7	—	—	—	—	—	—	—	—	—
(1) (2)	5.2				5.3									
IC804	13.8	10	5.6	0	6	.35	5.7	—	—	—	—	—	—	—
(1) (2)			5.2				5.3							
IC805	10	8.8	0	0	0	3.6	5.7	—	—	—	—	—	—	—
(1)		0	3.2	3.2		5.6	5.3							
(2)		8.8	0	0		3.4								
IC806	0	13.8	13.8	13.8	0	0	0	13.8	0	0	0	0	13.8	13.8
(1)		0						4.3	13.8		13.8	13.8	0	
(2)	13.8		0	0	13.8	12.5			0	12.5				

Transistor	Emitter	Base	Collector
Q801	0	.7	0
(1)		0	13.8
(2)		.7	0
Q802	0	.7	0
(1) (2)		.38	13.8
Q803	0	.7	5
Q804	0	0	13.8
(2)	0	.8	0

NOTE: All voltages are nominal and were measured with a VTVM, 13.8 VDC supply voltage. Microphone off-hook or SW4 in Monitor position.
1) Denotes readings with microphone in grounded Hang-up Clip and SW4 in Tone position.
2) Denotes readings with conditions as in 1) and R.F. Signal with Code Tone applied.



6-6 SCHEMATIC

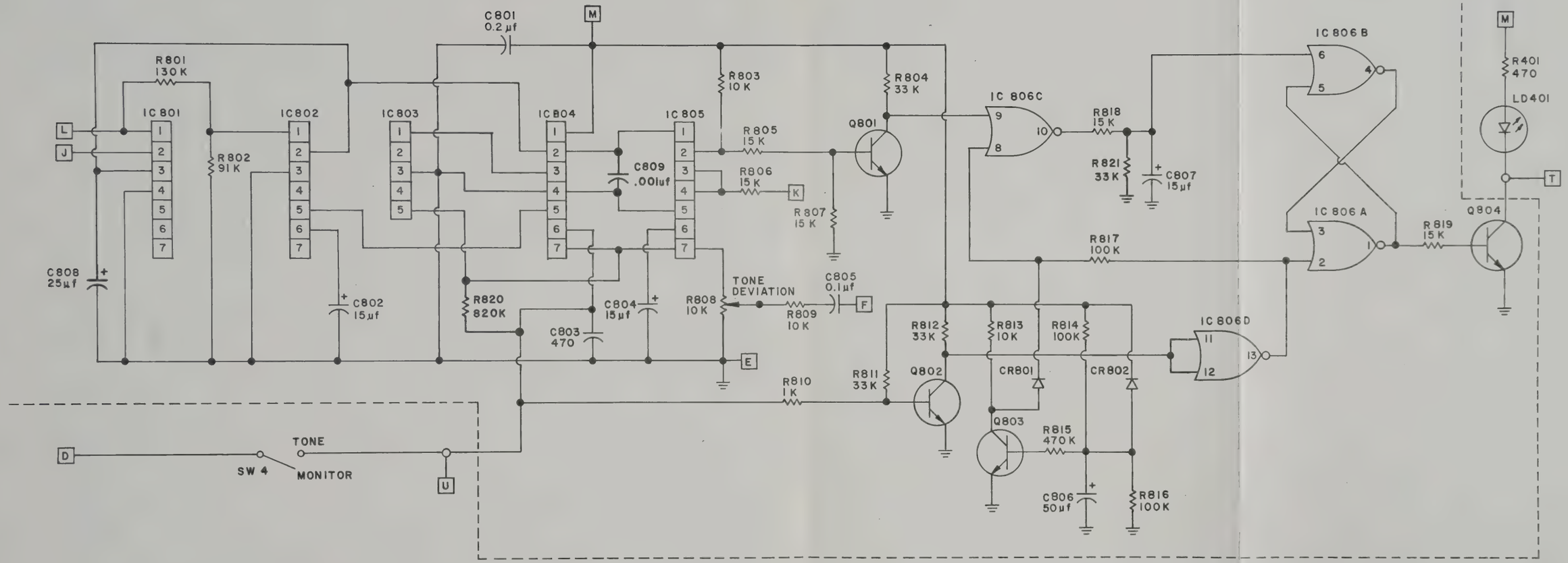
6-5 VOLTAGE DATA CHART

INTEGRATED CIRCUITS

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC801	4.4	AC	10	0	NC	NC	NC	—	—	—	—	—	—	—
IC802	1.8	10	0	NC	6	5.5	NC	—	—	—	—	—	—	—
②	1.6													
IC803	5.6	NC	0	NC	5.7	—	—	—	—	—	—	—	—	—
①②	5.2				5.3									
IC804	13.8	10	5.6	0	6	.35	5.7	—	—	—	—	—	—	—
①②			5.2				5.3							
IC805	10	8.8	0	0	0	3.6	5.7	—	—	—	—	—	—	—
①		0	3.2	3.2		5.6	5.3							
②		8.8	0	0		3.4								
IC806	0	13.8	13.8	13.8	0	0	0	13.8	0	0	0	0	13.8	13.8
①		0						4.3	13.8		13.8	13.8	0	
②	13.8		0	0	13.8	12.5			0	12.5				

Transistor	Emitter	Base	Collector
Q801	0	.7	0
①		0	13.8
②		.7	0
Q802	0	.7	0
①②		.38	13.8
Q803	0	.7	5
Q804	0	0	13.8
②	0	.8	0

NOTE: All voltages are nominal and were measured with a VTVM, 13.8 VDC supply voltage. Microphone off-hook or SW4 in Monitor position.
1) Denotes readings with microphone in grounded Hang-up Clip and SW4 in Tone position.
2) Denotes readings with conditions as in 1) and R.F. Signal with Code Tone applied.



NOTES:

1. ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARADS.
   ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS.
   ALL RESISTORS NOT SPECIFIED OTHERWISE ARE 1/4 WATT.
2. REFER TO DRAWING 700-195 FOR BASIC RADIO SCHEMATIC.
3. LETTERED BOXES ARE CONNECTION POINTS TO DRAWING 700-195
4. PART NUMBERS INDICATE LOCATION.
   0-99 CHASSIS MOUNTED
   400-499 LED DESPLAY BOARD
   800-899 TONE ENC/DEC BOARD

6-6 SCHEMATIC

6-7 PARTS LIST — DECODER BOARD

NOTE: When ordering parts, please include the following information:

a. Model Number
b. Item Number
c. Description
d. Part Number

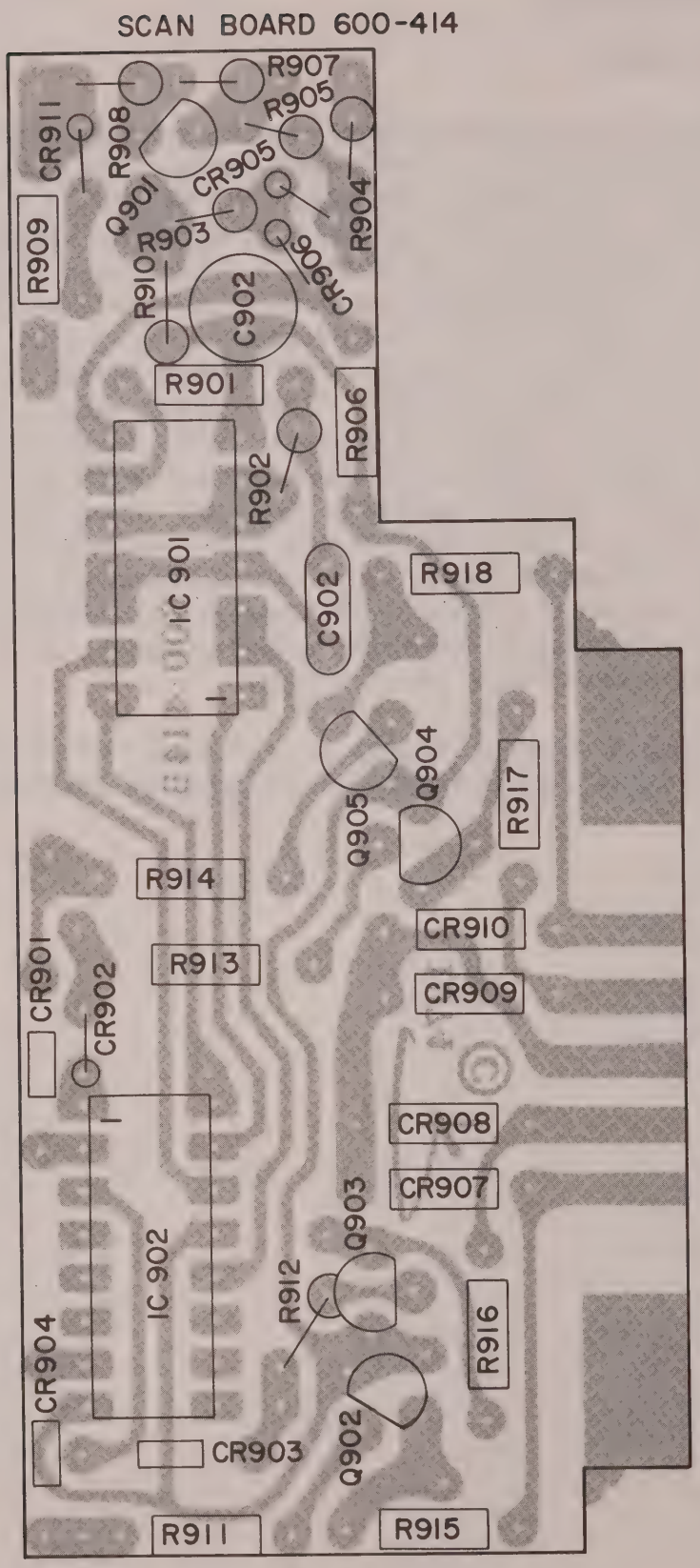
Item No.	Description	Part No.
	RESISTORS	
R801	130K ¼W 5%	4701-0134-032
R802	91K ¼W 5%	4701-0913-032
R803	10K ¼W 10%	4701-0103-042
R804	33K ¼W 10%	4701-0333-042
R805	15K ¼W 10%	4701-0153-042
R806	15K ¼W 10%	4701-0153-042
R807	15K ¼W 10%	4701-0153-042
R808	10K Trimmer	4751-0103-002
R809	1K ¼W 10%	4701-0102-042
R810	1K ¼W 10%	4701-0102-042
R811	33K ¼W 10%	4701-0333-042
R812	33K ¼W 10%	4701-0333-042
R813	10K ¼W 10%	4701-0103-042
R814	100K ¼W 10%	4701-0104-042
R815	470K ¼W 10%	4701-0474-042
R816	100K ¼W 10%	4701-0104-042
R817	100K ¼W 10%	4701-0104-042
R818	15K ¼W 10%	4701-0153-042
R819	15K ¼W 10%	4701-0153-042
R820	820K ¼W 10%	4701-0824-042
R821	33K ¼W 10%	4701-0333-042
	CAPACITORS	
C801	.2 mfd 12V gmv (Disc)	1502-0204-006
C802	15 mfd 10V 20%, (Tantalum)	1515-0150-002
C803	470pf 50V 20%, (Disc)	1523-0471-002
C804	15 mfd 10V 20%, (Tantalum)	1515-0150-002
C805	.1 mfd 12V 20%, (Disc)	1502-0104-005
C806	50 mfd 16V (Electrolytic)	1513-0500-002
C807	15 mfd 16V (Electrolytic)	1513-0150-002
C808	25 mfd 10V (Electrolytic)	1513-0250-002
C809	.001 mfd 50V 20%, (Disc)	1523-0102-002
	TRANSISTORS	
Q801	Silicon NPN	4801-0000-010
Q802	Silicon NPN	4801-0000-010
Q803	Silicon NPN	4801-0000-010
Q804	Silicon NPN	4801-0000-010
	INTEGRATED CIRCUITS	
IC801	Hybrid High-Pass	3133-5114-805
IC802	Hybrid Low-Pass	3133-5114-801
IC803	Hybrid Freq. Net.	3133-5114-804
IC804	Hybrid Band-Pass	3133-5114-802
IC805	Hybrid Detector	3133-5114-803
IC806	Quad Nor Gate	3170-3157-621

SECTION 7 SCAN ACCESSORY

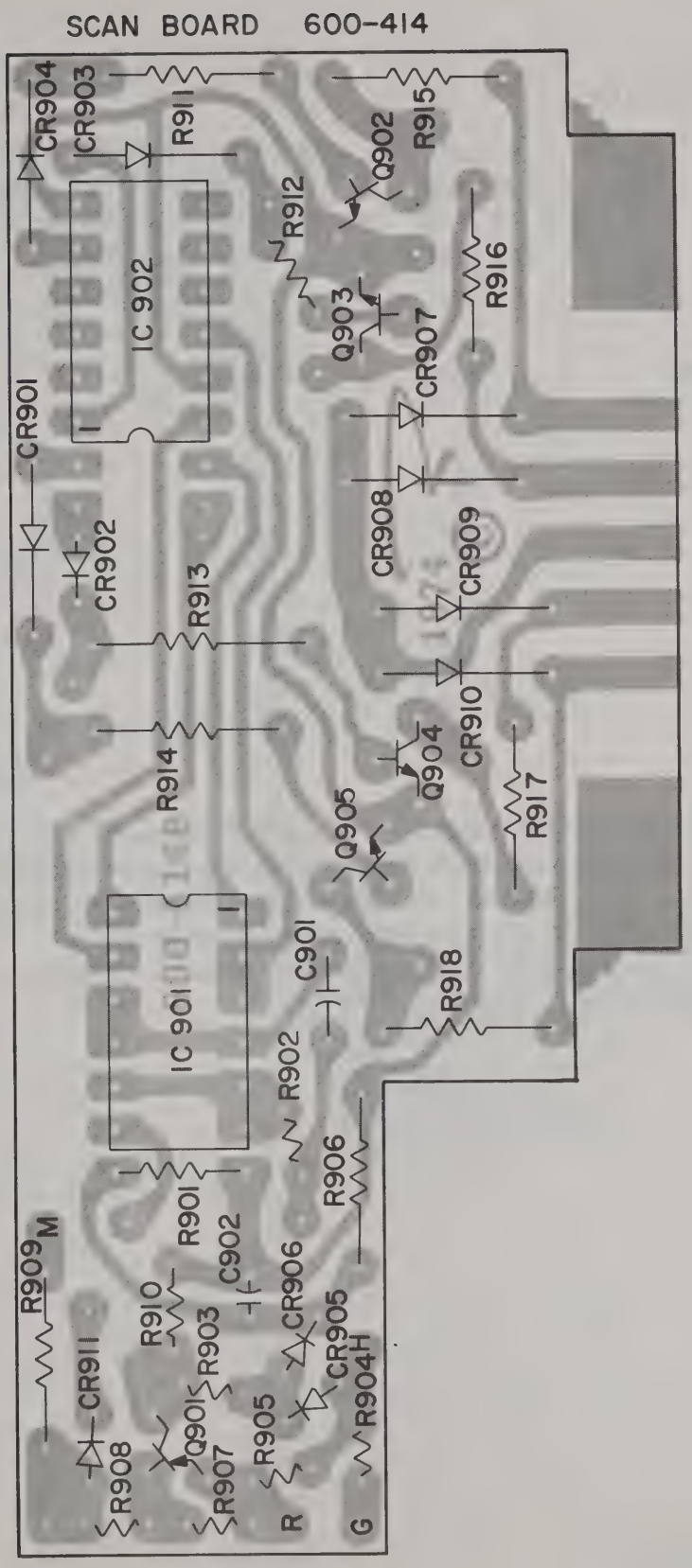
7-1 CIRCUIT DESCRIPTION

This circuit board assembly provides the receiver scanning function for the four-channel MICRO-COM 24s Receiver. The channel crystals are connected to the oscillators by the switches CR910/Q905, CR909/Q904, CR908/Q903, and CR907/Q902. When any switch is on, it also drives the corresponding channel indicator LED. In the Manual Mode, drive for the crystal switches is obtained from SW301B. In the Scan Mode, SW301B is disabled and drive is obtained from the Scan Counter IC902. With SW4 closed, and the microphone in the grounded Hang-up Clip, switch Q901 applies D.C. power to the scan circuitry. IC901 is an Oscillator that supplies pulses at about 15 PPS to IC902, the Scan Counter. IC902 is a four stage counter that pulses each channel switch in turn as long as it receives pulses from the oscillator. Pin eight of IC901 is connected to the squelch switch in the receiver circuit and is at ground potential with the receiver squelched. When the squelch opens, Pin eight is pulled up to the positive supply and the oscillator stops, stopping the counter. The receiver remains on whichever channel the counter has stopped at until the squelch closes. When the receiver is squelched, C902 discharges through R906, when the voltage at Pin eight, IC901 falls below about one-half of supply, the Clock Oscillator starts. This provides the familiar "Hang" feature.

When SW4 is open, or when the microphone is off-hook, Q901 is off and power is removed from the scan circuit, placing the channel switches under the control of the Manual Selector.



7-2 SCAN BOARD PARTS PLACEMENT DIAGRAM



7-3 SCAN BOARD BOTTOM VIEW

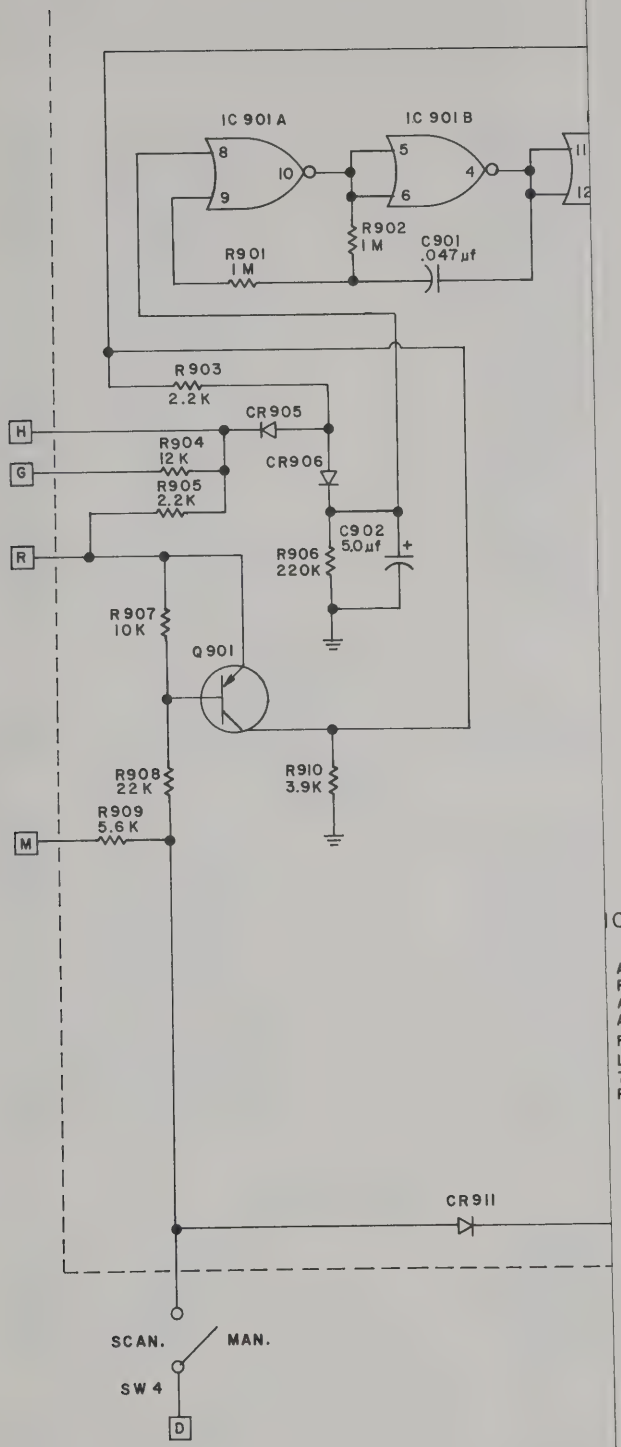
7-4 VOLTAGE DATA

INTEGRATED CIRCUITS

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC 901	0	8.2	8.2	3.8P	4.3P	4.3P	0	.5	4.1P	4.3P	3.8P	3.8P	4.4P	8.3	—	—
(1)				8.2	0	0	0	7.6	0	0	8.2	8.2	0			
IC 902	2P	2P	2P	NC	NC	NC	2P	0	NC	NC	NC	8.2	0	4.4P	0	8.2
(1)	0	7.8	0				0							0		

Transistor	Emitter	Base	Collector
Q901	8.2	8.6	8.2
(1)	8.4	7.6	8.2
Q902	0	.2P	6P
(1)	0	.8	0
Q903	0	.2P	6P
(1)	0	0	8
Q904	0	.2P	6P
(1)	0	0	8
Q905	0	.2P	6P
(1)	0	0	8

NOTE: All voltages are nominal and were measured with a VTVM, 13.8 VDC supply voltage. Receiver squelched, microphone in grounded Hang-up Clip, and SW4 closed. A "P" beside a voltage denotes that the meter reading is pulsating because the scanner circuitry is operating.
1) Denotes readings with SW4 open or microphone off-hook, and Manual Channel Selector on channel one.



OTES:

ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARAD.
ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS.
ALL RESISTOR NOT SPECIFIED ARE 1/4 WATT.
REFER TO DRAWING 700-195 FOR BASIC RADIO SCHEMATIC.
LETTERED BOXES ARE CONNECTION POINTS TO DRAWING 700-195
PART NUMBERS INDICATE LOCATION.
- 0-99 CHASSIS MOUNTED
- 200-299 RECEIVER R.F. BOARD
- 300-399 TRANSMITTER BOARD
- 600-699 LED DISPLAY BOARD
- 900-999 SCAN BOARD

7-5 SCHEMATIC

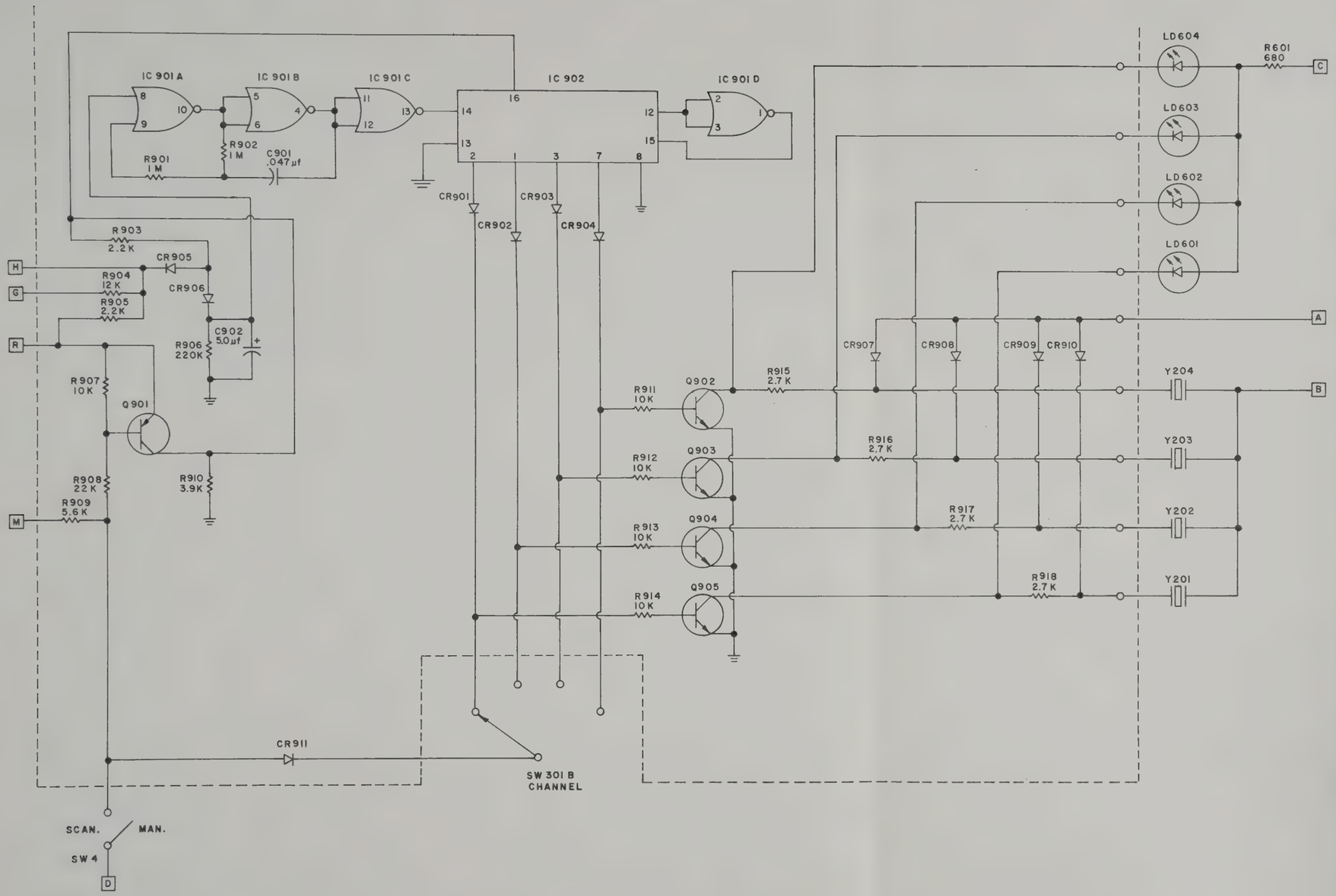
7-4 VOLTAGE DATA

INTEGRATED CIRCUITS

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC 901	0	8.2	8.2	3.8P	4.3P	4.3P	0	.5	4.1P	4.3P	3.8P	3.8P	4.4P	8.3	—	—
(1)				8.2	0	0	0	7.6	0	0	8.2	8.2	0			
IC 902	2P	2P	2P	NC	NC	NC	2P	0	NC	NC	NC	8.2	0	4.4P	0	8.2
(1)	0	7.8	0				0							0		

Transistor	Emitter	Base	Collector
Q901	8.2	8.6	8.2
(1)	8.4	7.6	8.2
Q902	0	.2P	6P
(1)	0	.8	0
Q903	0	.2P	6P
(1)	0	0	8
Q904	0	.2P	6P
(1)	0	0	8
Q905	0	.2P	6P
(1)	0	0	8

NOTE: All voltages are nominal and were measured with a VTVM, 13.8 VDC supply voltage. Receiver squelched, microphone in grounded Hang-up Clip, and SW4 closed. A "P" beside a voltage denotes that the meter reading is pulsating because the scanner circuitry is operating.
1) Denotes readings with SW4 open or microphone off-hook, and Manual Channel Selector on channel one.



NOTES:

1. ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARAD.
   ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS.
   ALL RESISTOR NOT SPECIFIED ARE 1/4 WATT.
2. REFER TO DRAWING 700-195 FOR BASIC RADIO SCHEMATIC.
3. LETTERED BOXES ARE CONNECTION POINTS TO DRAWING 700-195
4. PART NUMBERS INDICATE LOCATION.
   0-99 CHASSIS MOUNTED
   200-299 RECEIVER R.F. BOARD
   300-399 TRANSMITTER BOARD
   600-699 LED DISPLAY BOARD
   900-999 SCAN BOARD

7-5 SCHEMATIC

7-6 PARTS LIST

Item No.	Description	Part No.
	RESISTORS	
R901	1 meg 10%, ¼W	4701-0105-042
R902	1 meg 10%, ¼W	4701-0105-042
R903	2.2K 10%, ¼W	4701-0222-042
R904	12K 10%, ¼W	4701-0123-042
R905	2.2K 10%, ¼W	4701-0222-042
R906	220K 10%, ¼W	4701-0224-042
R907	10K 10%, ¼W	4701-0103-042
R908	22K 10%, ¼W	4701-0223-042
R909	5.6K 10%, ¼W	4701-0562-042
R910	3.9K 10%, ¼W	4701-0392-042
R911	10K 10%, ¼W	4701-0103-042
R912	10K 10%, ¼W	4701-0103-042
R913	10K 10%, ¼W	4701-0103-042
R914	10K 10%, ¼W	4701-0103-042
R915	2.7K 10%, ¼W	4701-0272-042
R916	2.7K 10%, ¼W	4701-0272-042
R917	2.7K 10%, ¼W	4701-0272-042
R918	2.7K 10%, ¼W	4701-0272-042
	CAPACITORS	
C901	.047 mfd 100V 10%, (Mylar)	1508-0473-610
C902	5 mfd 50V (Electrolytic)	1513-0050-004
	DIODES	
CR901	Silicon Diode	4805-1241-200
CR902	Silicon Diode	4805-1241-200
CR903	Silicon Diode	4805-1241-200
CR904	Silicon Diode	4805-1241-200
CR905	Silicon Diode	4805-1241-200
CR906	Silicon Diode	4805-1241-200
CR907	Germanium Diode	4807-1233-900
CR908	Germanium Diode	4807-1233-900
CR909	Germanium Diode	4807-1233-900
CR910	Germanium Diode	4807-1233-900
CR911	Silicon Diode	4805-1241-200
	TRANSISTORS	
Q901	PNP Silicon	4801-0000-060
Q902	NPN Silicon	4801-0000-010
Q903	NPN Silicon	4801-0000-010
Q904	NPN Silicon	4801-0000-010
Q905	NPN Silicon	4801-0000-010
	INTEGRATED CIRCUITS	
IC901	Quad Nor Gate	3170-3157-621
IC902	Counter	3130-3193-502

SECTION 8 TTS ACCESSORY

8–1 CIRCUIT DESCRIPTION

This accessory provides a two (2) tone sequential signalling function for the MICRO-COM 21t and 21th. Additionally, a call lamp function is provided to alert the user that an unattended radio has been signalled.

Detected signal from IC102 in the receiver is fed to Q1101, Q1102; Q1101 is an amplifier and Q1102 is a low pass filter which removes high frequency noise from the tone bursts. Tone A, the first tone burst frequency is applied to both FL1101 and FL1102. FL1101 passes Tone A frequency on to IC1101A as it is mechanically resonant at Tone A frequency. IC101A is a hex inverter biased as an amplifier. IC1101B together with CR1101 act as a detector placing a logic high at Pin 6 IC1101E, a NOR GATE, switching Pin 5 to a logic low for duration of Tone A. This action causes a logic low to be transmitted to Pin 8, 9 of IC1102A, an inverter, switching Pin 10 to a logic high holding Pin 5 of IC1101E at a logic low even after Tone A is no longer detected. C1107 then charges in the polarity indicated through R1116 and Pin 5 IC1101E until Pin 8, 9 logic high threshold is reached, at which time IC1102A and IC1101E return to their original state. Thus, during the C1107 charging duration, a logic high is held at Pin 14 IC1101F awaiting detection of Tone B. The detection of Tone B is identical to that of Tone A, and when detected, a logic high is present also at Pin 15 IC1101F, sending a logic low through inverter Q1103 to Pin 2 of IC1102C. IC1102C, D form a latching flip-flop. Thus, Q1104 will continue to enable the call lamp after the coded signal is removed. The latching action also causes Q1105 to remain in a non-conducting state after tones are detected.

The Microphone Hang-up Button is connected through the Tone/Monitor Switch to IC1102D. When the Hang-up Button is grounded and SW4 is closed, the circuit operates as above. When the Hang-up Button is ungrounded, or SW4 is open, the decoder is disabled leaving the receiver under carrier-squelch control. Lifting the microphone off-hook after a tone sequence is decoded, resets the flip-flop, squelch switch Q1105 and call lamp enable Q1104 to the standby state.

The TTS Decoder unsquelches the receiver provided Tone A is sent preceding Tone B; and both tones are of proper duration. Reverse tone sequences will cause the receiver to remain squelched. For the TTS System described herein to properly function, both Tone A and Tone B each must be 0.5 sec or greater in duration. Additionally, the interval between tones can be zero to 2.0 sec in duration, provided that overall duration of Tone A plus interval is 2.5 sec or less. (See Figure -1-).

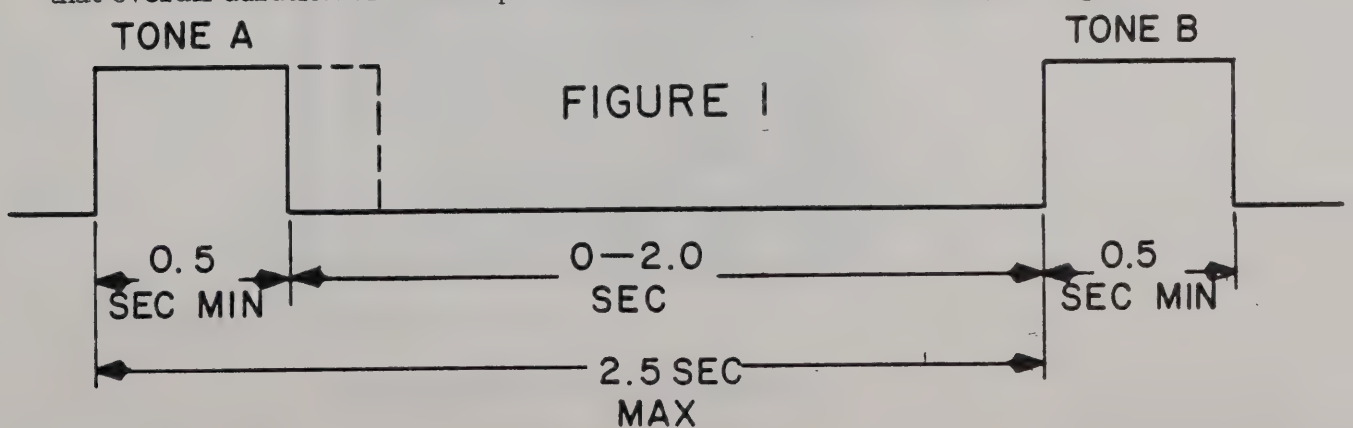
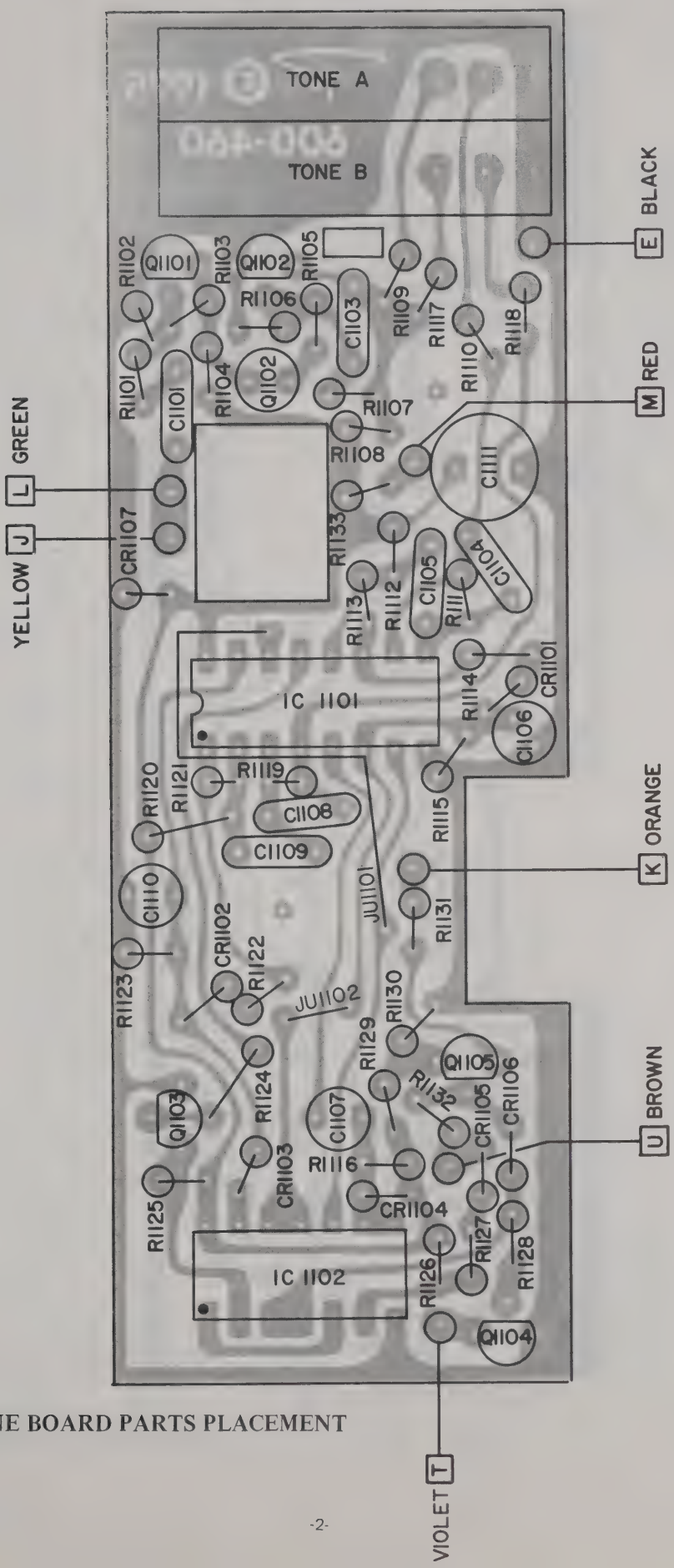


FIGURE 1

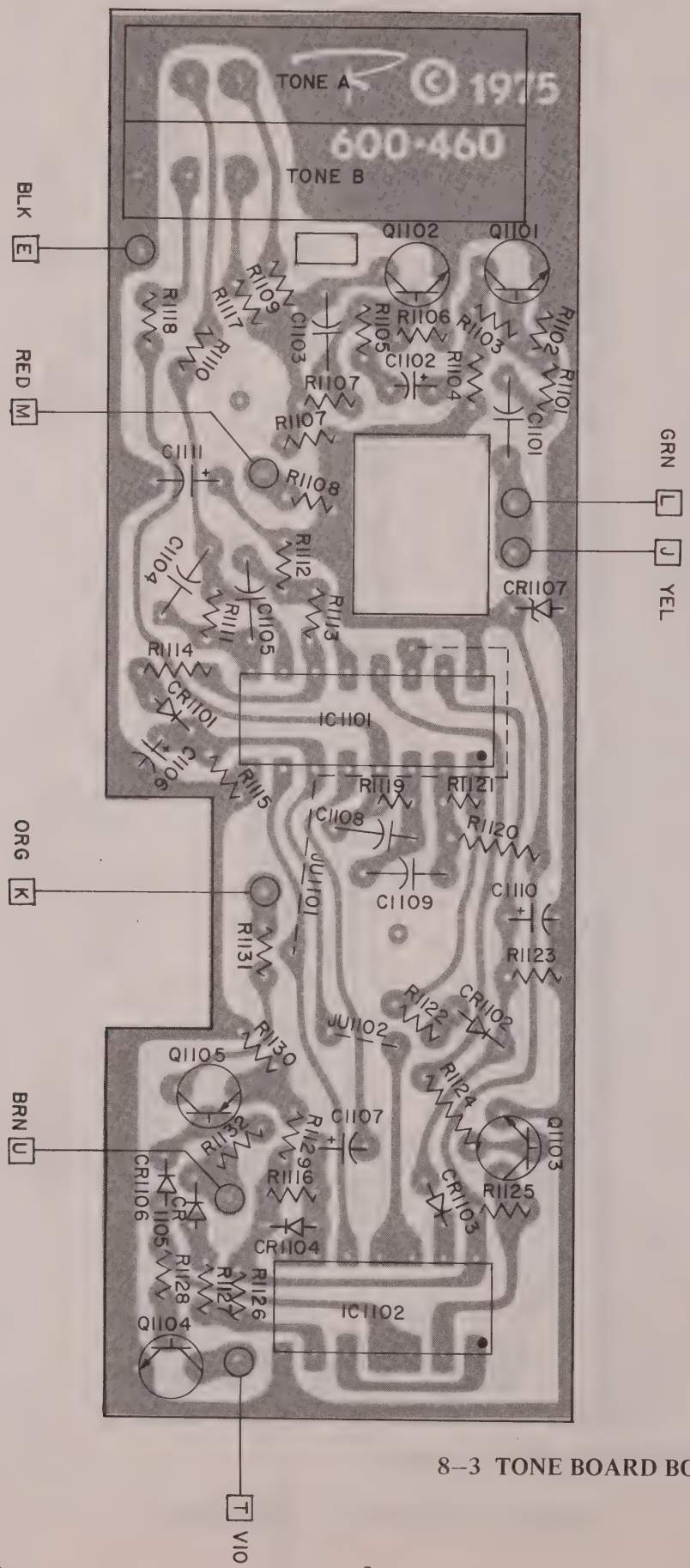
SCHEMATIC – TTS DECODER BOARD

T.T.S DEC. BOARD 600-460



8–2 TONE BOARD PARTS PLACEMENT

T.T.S. DECODER BOARD 600-460



8–3 TONE BOARD BOTTOM VIEW

8–4 VOLTAGE DATA

Integrated Circuits – DC Voltages

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1101	3.4	5.8	4.0	4.0	7.8	0	0	0	4.0	4.0	3.4	5.1	7.8	0	0	7.8
2	0				0	6.3	7.8						7.8	7.8	0	
3	3.4				7.8	0	7.8						0	7.8	7.8	
IC1102	7.8	0	0	0	7.8	7.8	0	7.8	7.8	0	0	0	7.8	7.8		
1	7.8	0	0	0	7.8	0.7		7.8	7.8	0	0	0	7.8			
2	7.8	0	0	0	7.8	0.7		0	0	7.8	6.3	6.3	0			
3	0	7.8	7.8	7.8	0	0.7		0	0	7.8	0	0	7.8			

Transistors – DC Voltage

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q1101	0	0.6	4.0
Q1102	0	0.6	3.4
Q1103	0	0.6	0
3	0	0	7.8
Q1104	0	0	12.5
3	0	0.6	0
Q1105	6.5	7.2	0
1	6.0	5.4	6.0
3	6.5	7.2	0

Integrated Circuits – AC Voltages

Voltages in dbm
Freq = 1050Hz
Deviation = 3KHz (-14dbm signal level [L])

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1101	+34	+32	+32	+14	–	–	–	–	+32	+14	+34	+32	–	–	–	–
	8Vp-p Square Wave										8Vp-p Square Wave					

TRANSISTORS – AC VOLTAGES

TRANSISTOR	EMITTER	BASE	COLLECTOR
Q1101	–	-29dbm	+20dbm
Q1102	–	+16dbm	+22dbm 6Vp-p Square Wave

NOTE: All voltages are nominal and were measured with a VTVM, +13.8 VDC Supply voltage. Microphone off-hook or SW4 in Monitor Position.

1 Denotes readings with microphone in grounded hang-up clip and SW4 in Tone position.

2 Denotes readings with conditions as in (1) and RF Signal with Tone A applied.

3 Denotes readings with conditions as in (1) and RF Signal with Tone B applied following Tone A transmission within .5 second

8–5 PARTS LIST TONE BOARD 600-482

Item No.	Description	Part No.
	RESISTORS	
R1101	15K, ¼W, 10%	
R1102	33K	
R1103	150K	
R1104	4.7K	
R1105	1K	
R1106	6.8K	
R1107	22K	
R1108	4.7K	
R1109	150K	
R1110	150K	
R1111	820K	
R1112	330K	
R1113	1 Meg	
R1114	33K	
R1115	470K	
R1116	330K	
R1117	150K	
R1118	150K	
R1119	820K	
R1120	330K	
R1121	1 Meg	
R1122	33K	
R1123	470K	
R1124	33K	
R1125	33K	
R1126	33K	
R1127	1K	
R1128	15K	
R1129	1.5K	
R1130	6.8K	
R1131	15K	
R1132	150K	
R1133	560 ohm, ¼W, 10%	
	CAPACITORS	
C1101	.2mf, +80-20%, 25v BC-12	1502-0204-006
C1102	1.0mf, 50v, 85D III Type U	1513-0010-004
C1103	.002mf, 20%, 50v YW-202M	1523-0202-002
C1104	27pf, 10%, NPO 50v	1500-0270-650
C1105	.01mf, +80-20%, 25v BC-25	1502-0103-004
C1106	1.0mf, 50v, 85D III Type U	1513-0010-004
C1107	10mf, 10v, 85D III Type U	1513-0100-001
C1108	27pf, 10%, NPO 50v	1500-0270-650
C1109	.01mf, +80-20%, 25v BC-25	1502-0103-004
C1110	1.0mf, 50v, 85D III Type U	1513-0010-004
C1111	50mf, 16v, 85D III Type U	1513-0500-002
	INTEGRATED CIRCUITS	
IC1101	MC-14572 CP 301-935-9	3130-3193-509
IC1102	MM74C02N 301-576-21	3130-3157-621
	TRANSISTORS	
Q1101	SPS-952	4801-0000-010
Q1102	SPS-952	4801-0000-010
Q1103	SPS-952	4801-0000-010
Q1104	MPSA05	4801-0000-005
Q1105*	2N5227 WT	4801-0000-060

* White Top *WT = White Top

Item No.	Description	Part No.
	DIODES	
CR1101	Silicon IN4148 102-412	4805-1241-200
CR1102	Silicon IN4148 102-412	4805-1241-200
CR1103	Silicon IN4148 102-412	4805-1241-200
CR1104	Silicon IN4148 102-412	4805-1241-200
CR1105	Silicon IN4148 102-412	4805-1241-200
CR1106	Silicon IN4148 102-412	4805-1241-200
CR1107	Silicon Zener 8.2v IN4738A	4808-0000-008
	TONE ELEMENTS	
FL1101	Microfork (Specify Freq)	2398-0000-001
FL1102	Microfork (Specify Freq)	2398-0000-001

SECTION 9 AUDIO PA OPTION

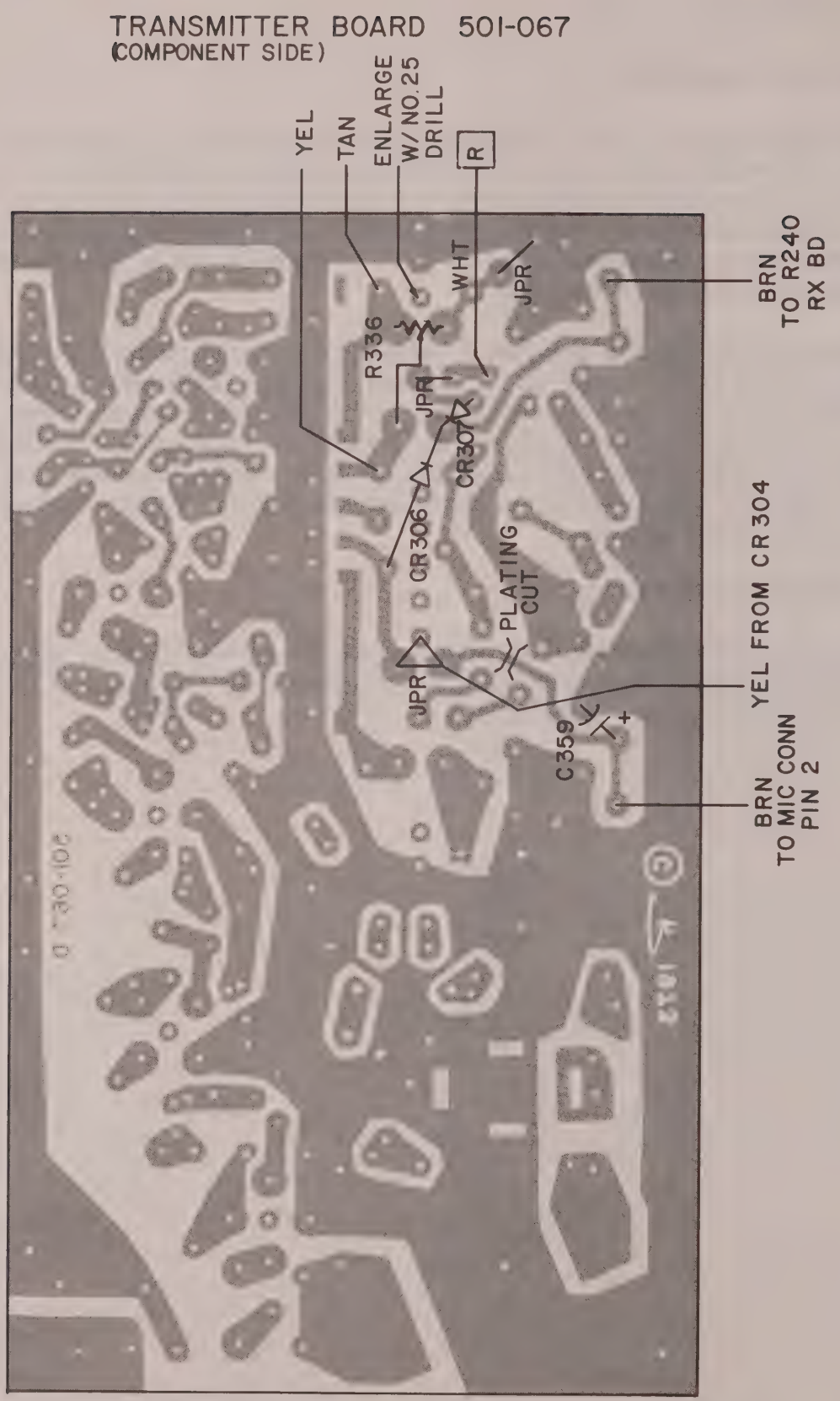
9–1 CIRCUIT DESCRIPTION

This option allows for the microphone and radio to double as an audio power amplifier. The scheme utilizes the radio's deviation control circuit IC201A, B and the receiver audio amplifier section to yield 3-watt continuous output with normal voice levels at microphone input. The PA/RADIO function is selected by a front panel push button switch. Audio gain in the PA mode is internally set by potentiometer R336 located on the transmitter board.

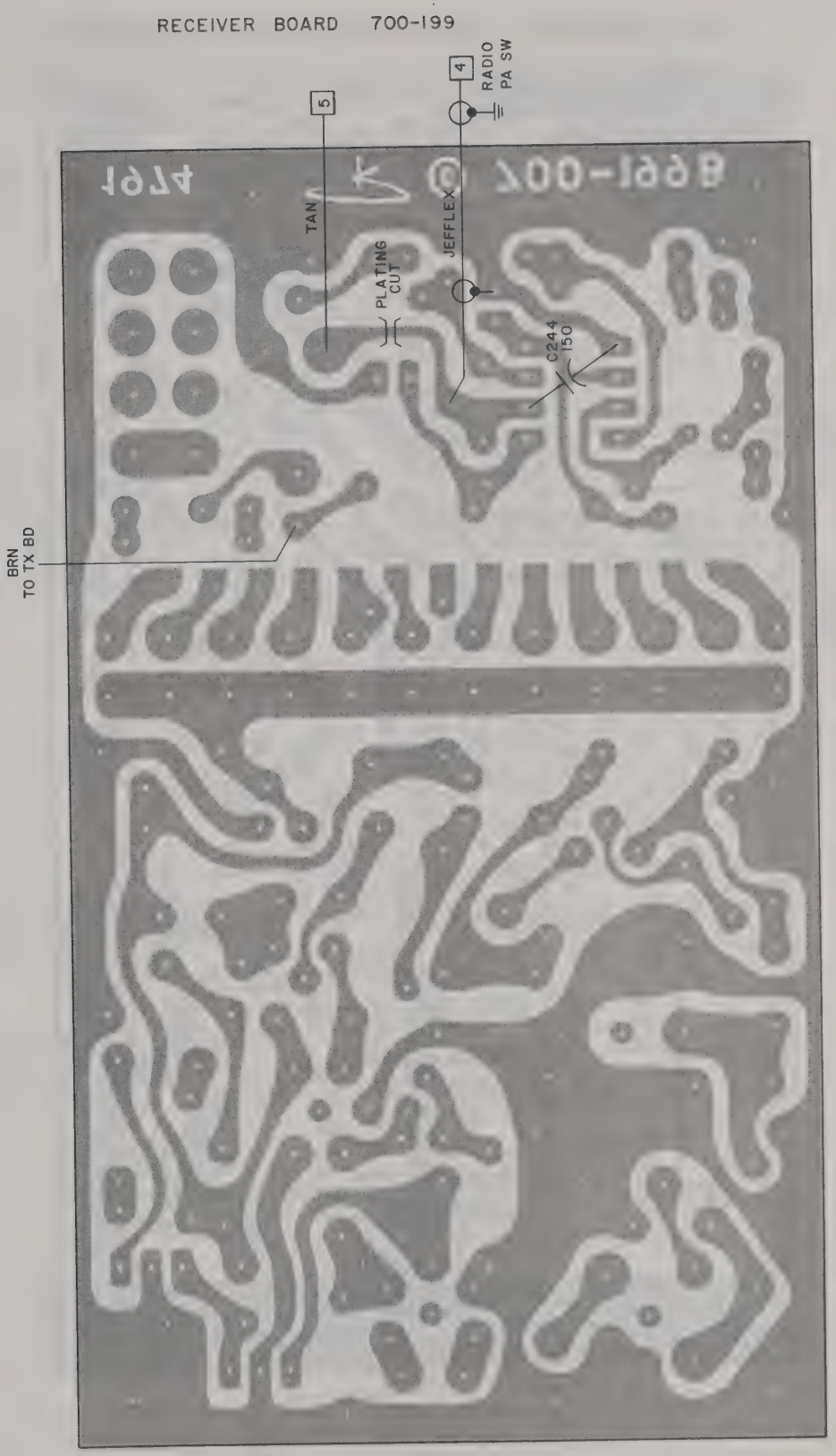
Switch SW5 provides the changeover connections within the radio to provide normal RADIO operation in the out position, and when pushed in, allows for PA operation by depressing microphone push-to-talk button. SW5A switches the receiver volume control out and the internally set potentiometer R336 to the 3-watt audio amplifier section. SW5B disables transmitter keyed ground and provides a ground to enable optional tone decoder circuits. SW5C switches microphone audio to R336. SW5D switches the internal and external speakers.

9–2 ADJUSTMENT PROCEDURE

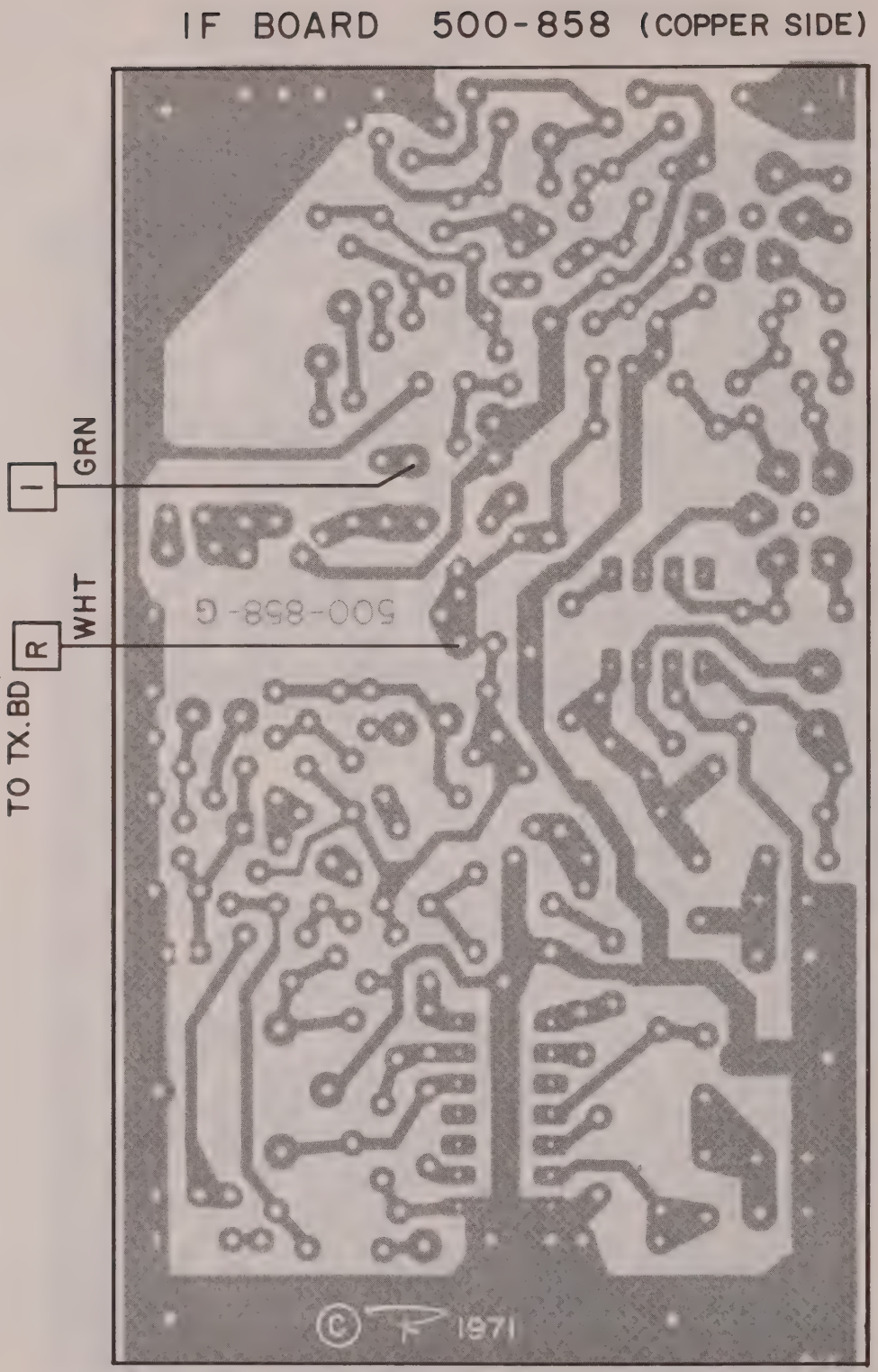
With an oscilloscope connected to external speaker, adjust R336 so that no clipping of waveform is evident when whistling into microphone. As an alternative, adjust for 8.7V p-p across 3.2 ohm, 3-watt load.



9–3 TRANSMITTER BOARD MODIFICATION DIAGRAM

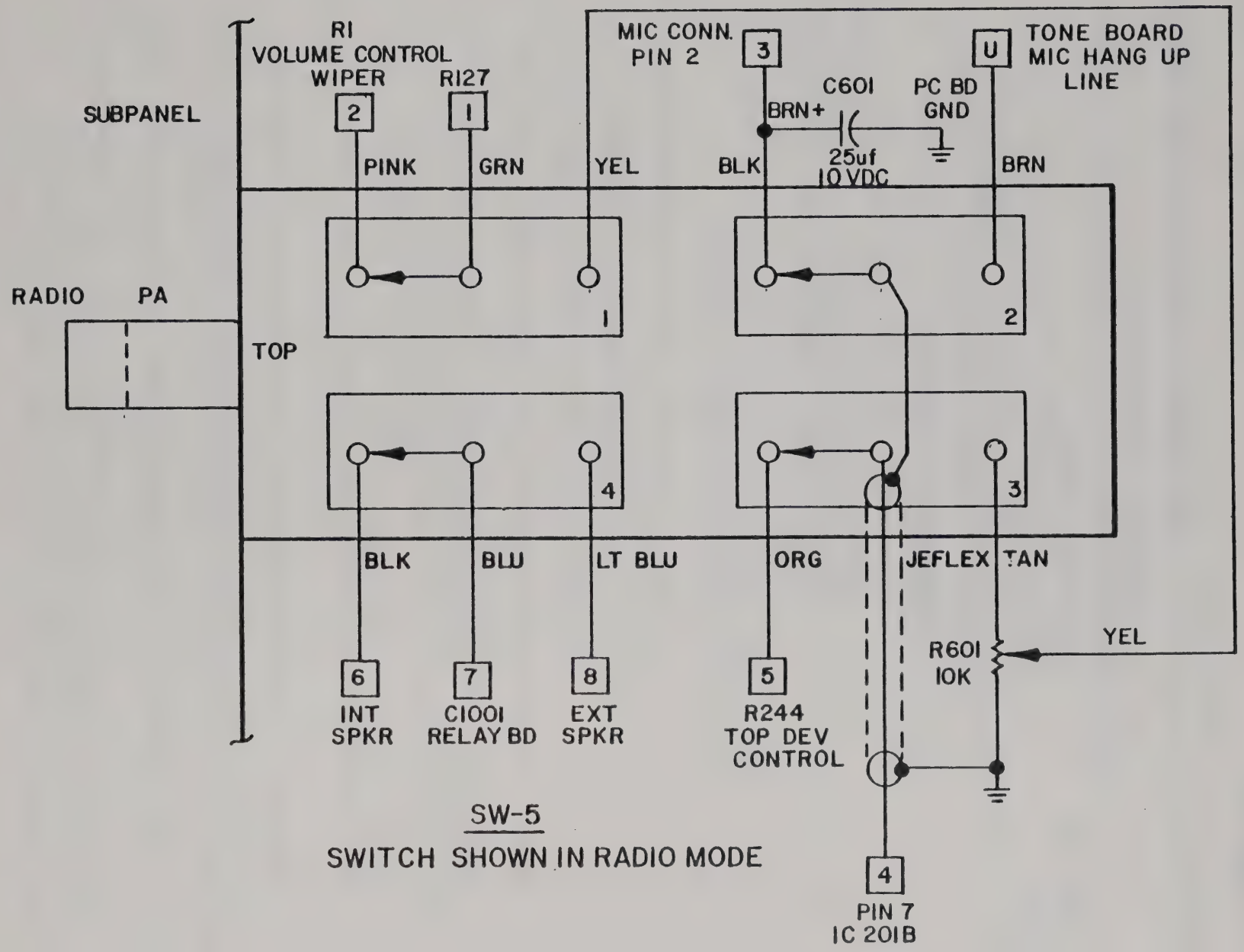


9–4 RECEIVER BOARD MODIFICATION DIAGRAM



9–5 IF BOARD MODIFICATION DIAGRAM

9-6 WIRING DIAGRAM – SWITCH



SW-5

SWITCH SHOWN IN RADIO MODE

Item No.	Description	Part No.
	ELECTRICAL COMPONENTS	
R336	10K POT, Horiz Mount	
CR306, 307	Diode, Silicon 1N4148	
C359	CAP Elec, 22 μf, 10 VDC	
SW5	Switch, Push-Push	
	PB-10 Series, Centralab 1-Station (W/O Tone)	
	PB-10 Series, Centralab 2-Station (W/Tone)	#301-749-3
	MECHANICAL COMPONENTS	
	Faceplate (MICRO-COM 21/PA)	2403-5132-600
	Faceplate (MICRO-COM 21h/PA)	2403-5132-700
	Faceplate (MICRO-COM 21t/PA)	2403-5131-000
	Faceplate (MICRO-COM 21th/PA)	2403-5132-500

10-1 DIFFERENCES BETWEEN MICRO-COM AND BTH LINES

BTH 201, BTH 202 and BTH 204 models manufactured after December, 1975, are identical to Micro-Com series models with the following exceptions:

1. XF201, XF202, C236, R232 omitted.
   L205 replaced by T202, Part # 1800-3170-200.
   L101 replaced by T101, Part # 1803-3182-700.
   T202 and T101 jumpered together to be mutually inductive.

2. Displays: BTH 201 - LED BOARD 301-746 Replaces 501-176
   BTH 202 - LED BOARD 301-747 Replaces 501-179
   BTH 204 - LED BOARD 302-239 Replaces 501-177

   Hookup for these boards is identical to that for the one, two and four channel Micro-Com Models.

3. Faceplates: BTH 201 - 2403-3174-300 Replaces 2400-5117-100
   BTH 202 - 2403-3174-400 Replaces 2403-5117-000
   BTH 204 - 2403-5106-500 Replaces 2403-5115-100

10-2 I.F. ALIGNMENT PROCEDURES (TO REPLACE SECTION 3-3)

10-2-1 Disconnect RF Signal Generator from antenna input.

10-2-2 Connect AC voltmeter across speaker terminals.

10-2-3 Adjust volume control for 0.5 volt noise reading on AC voltmeter.

10-2-4 Peak T102 (bottom core and top core, in that order) for maximum noise (maximum meter reading on AC voltmeter). If circuit is not badly misaligned, the correct point should be within two turns of the cores' present position.

NOTE: Coils will have two peaks; adjust core to peak away from the center of form.

10-2-5 Adjust volume control for 1.0 volt noise reading on AC voltmeter.

10-2-6 Connect the R.F. Signal Generator to the antenna input jack. Turn modulation off. Set the generator to the operating crystal frequency.

10-2-7 Adjust the Signal Generator output until the voltmeter reads 0.2 volts.

10-2-9 Adjust T101, T202, T201 (bottom core) and T201 (top core), (in that order), for maximum quieting (lowest meter reading). Adjust Signal Generator to maintain reading on AC voltmeter between 0.1 and 0.2 volts. If two peaks occur, use the one away from the center of the coil form.

10-2 (cont.)

10-2-9 Set the generator frequency to the secondary image frequency. This is 910 KHz BELOW the channel frequency.

NOTE: If the second oscillator is at 11.155 MHz, the secondary image frequency is 910 KHz ABOVE the channel frequency. Check the frequency marked on top of Y101 (10.245 MHz or BELOW and 11.155 for ABOVE).

10-2-10 Adjust the Signal Generator output until voltmeter reads 0.2 volts.

10-2-11 Adjust T102 (bottom core), T102 (top core), T101 and T202 (in that order) for maximum quieting degradation (highest meter reading). Adjust Signal Generator output to maintain voltmeter reading between 0.1 and 0.2 volts. The correct position for the cores should be within two turns of the position in Step No. 4 and 8.

10-3 OPTIONS

All Micro-Com VHF transceiver accessories may be installed in the BTH line transceivers but these accessories are not available as a factory installed BTH option.